

Specification Amendments:

Drawing Figures

Fig. 1 is a top view of a closure for a leak-proof drinking container.

Fig. 1A is the cross-sectional view taken as indicated by section line A-A applied to Fig. 1.

Fig. 1A' is the same cross-sectional view as Fig. 1A, showing the container attached to the closure.

Fig. 1A'' is the same cross-sectional view as ~~Fig. 1A~~ Fig. 1A', showing the recessed channel as part of the container.

Fig. 2 is the same cross-sectional view as ~~Fig. 1A~~ Fig. 1A', showing the closure containing a spout. ~~multiple recessed channels as part of the closure.~~

~~Fig. 2A is the same cross-sectional view as Fig. 1A, showing multiple recessed channels as part of the container.~~

~~Fig. 2B is the same cross-sectional view as Fig. 1A, showing multiple recessed channels as part of both the closure and the container.~~

Fig. 3 is the same cross-sectional view as ~~Fig. 1A~~ Fig. 1A', showing the recessed channel as part of both the closure and the container.

Fig. 4 is the same cross-sectional view as Fig. 1A', showing the closure containing an alternate spout.

Reference Numerals in Drawings

- 10 Closure
- 11 Recessed channel
- 12 Container
- 13 Outlet passage
- 14 Fluid exit
- 15 Fluid entrance
- 16 Spout

Description-Figs. 1 through [[3]] 4

Referring to the drawings, the leak-proof closure of the present invention is indicated as reference numeral 10. The closure 10 may be made of materials such as polypropylene, polyethylene, thermoplastic rubbers, or a combination thereof and can be reusable or disposable. The closure 10 is circular in shape, having a substantially planar cover portion and may vary in size depending upon the size of the container 12. The closure 10 is shown without a vent means. If a vent is used, it will require a vent which opens at a predetermined pressure differential between the interior and exterior of the container 12. When container 12 is overturned a partial vacuum will be created in the container 12. The vent must not open as a result of this partial vacuum or liquid can leak from the container 12. However, when in use, the liquid will be withdrawn from the container 12 creating a greater partial vacuum. The vent must open at this greater partial vacuum. The recessed channel 11 can be part of closure 10, container 12, or both. When container 12 and closure 10 are assembled by a friction fit or mating threads, outlet passage 13 is formed. In the preferred embodiment, outlet passage 13 is substantially a single loop helix, as shown in fig. 1A'. It might be desirable to insert mold or over mold a thermoplastic rubber or other flexible material onto either the closure 10, the container 12, or both in the area where outlet passage 13 is formed. This would allow for an improved seal between the closure 10 and the container 12. The volume of outlet passage 13 should be approximately .060 cubic inches or greater. A volume less than .060 cubic inches would increase the probability of the liquid leaking from the container. The cross-sectional area of outlet passage 13 should be large enough to provide for easy withdrawal of the liquid from the container 12. The cross-sectional area of outlet passage 13 should be small enough to prevent air bubbles from flowing past the liquid in the outlet passage 13 when container 12 is overturned. It might be desirable to vary the cross-sectional area of the outlet passage 13 making it smaller in some areas and larger in other areas. It might also be desirable for the outlet passage 13 to have a textured surface finish. The outlet passage 13 has

two ends, fluid entrance 15 and fluid exit 14. In the preferred embodiment, fluid entrance 15 and fluid exit 14 are substantially radially aligned as shown in fig. 1A'. The recessed channel 11 is shown in unity, however it might be desirable to have multiple recessed channels which terminate at the same point or in close proximity with one another. The closure 10 is shown without a spout, however it might be desirable have a spout with a through hole which would provide for communication between the end of the spout and fluid exit 14, thus extending outlet passage 13. The shape of spout 16 is immaterial to the function of the present invention.

Operation-Figs. 1 through [[3]] 4

Container 12 and closure 10 are molded or manufactured then assembled. Recessed channel 11 is part of container 12, closure 10, or both. Outlet passage 13 is formed when container 12 and closure 10 are assembled. When withdrawal of the liquid in the container 12 is desired, external suction is applied at the fluid exit 14 of outlet passage 13. This allows for delivery of the contained liquid which flows into fluid entrance 15, through outlet passage 13, and out of fluid exit 14. When the suction is released the liquid in outlet passage 13 will return to container 12 due to the partial vacuum in container 12. When container 12 is overturned, liquid will begin to flow into outlet passage 13 at fluid entrance 15, which is at substantially the lowest liquid level in the preferred embodiment. The displacement of liquid from the container 12 will create a partial vacuum in container 12. This partial vacuum will prevent the liquid from reaching fluid exit 14 if the outlet passage 13 has sufficient volume, thus it will not leak.